SECTION 1.6 COMPOUND INEQUALITIES

INEQUALITIES

< Less than AND (between)

$x < 8$

$-8 < x < 8$

***hint: arrow points left to add negative # to the left**

> Greater than OR (opposite direction)

$x > 8$

$x > 8$ OR $x < -8$

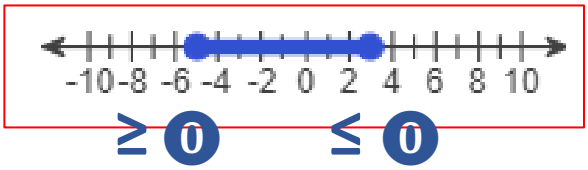
***hint: arrow point right, add another problem to the right**

< > open circle on graph with ( ) **≤ ≥ closed circle on the graph with [ ]**

1) Solve the following compound inequality. Graph the solution.

$3x \geq -15$ and $6x \leq 18$ **solve each for x** **AND (between)**

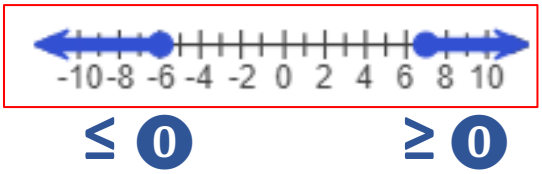
A. $-5 \leq x \leq 3$ (Type integers or decimals.)



2) Solve the following compound inequality. Graph the solution.

$9x \leq -54$ or $5x \geq 35$ **solve each for x** **OR (opposite direction)**

B. $x \leq -6$ or $x \geq 7$ (Type integers or decimals.)



3) Solve the inequality. Graph the solutions.

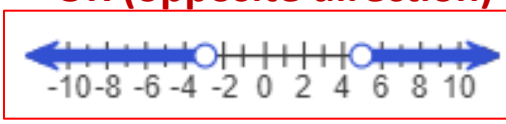
$3t - 2 < -11$ or $2t + 3 > 13$

$3t < -9$ or $2t > 10$

OR (opposite direction)

A. $t < -3$ or $t > 5$

< O



> O

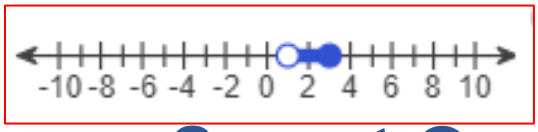
< > open circle on graph with ( ) ≤ ≥ closed circle on the graph with [ ]

4) Write the interval as an inequality. Then graph the solutions.

(1,3] **AND (between)**

$1 < x \leq 3$

< ( ] ≤

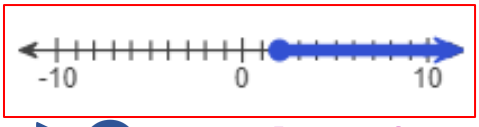


> O ( ] ≤ O

5) Write the inequality in interval notation. Then graph the interval.

$x \geq 2$ $[2,\infty)$ **≥ arrow right means ∞)**

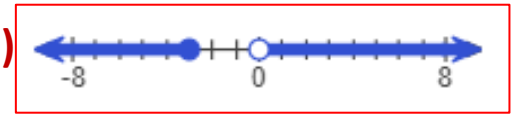
arrow right



≥ O [,∞)

6) Write the inequality in interval notation. Then graph the interval.

$x \leq -3$ or $x > 0$ **OR (opposite direction)**



A. $(-\infty, -3]$ or $(0,\infty)$

≤ O (-∞,] (,∞) > O

≤ arrow left > arrow right

7) Solve the inequality. Write the set in interval notation.

$3 < x + 6 \leq 11$

$-6 \quad -6 \quad -6$

$-3 < x < 5$

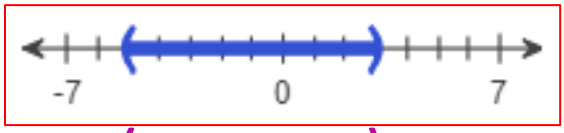
$(-3,5]$

AND (between)

8) Solve the compound inequality. Graph the solution set and write it in interval notation.

$x < 3$ and $x > -5$

AND (between)



( )

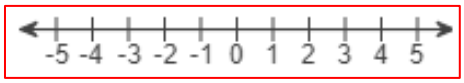
A. The solution set is $(-5,3)$.

9) Solve the compound inequality. Graph the solution set and write it in interval notation.

AND (between)

$x \le 1$ and $x \ge 2$

at no point do the graphs join or overlap

therefore it is the empty set 

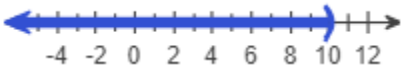
There is no solution

10) Solve the compound inequality. Graph the solution set and write it in interval notation.

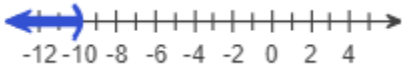
AND (between)

$x < -10$ and $x < 10$

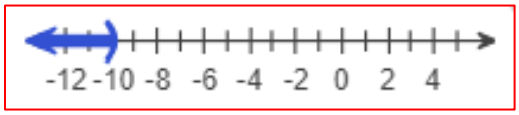
arrow of inequality points in graphs direction



X< -10 AND so we can only use what overlaps



X < 10

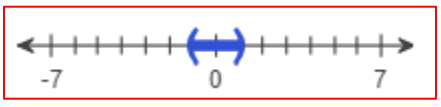


A. The solution set is $(-\infty, -10)$.

(-∞,)

11) Solve the compound inequality. Graph the solution set and write it in interval notation.

$x < 1$ and $x > -1$ **AND (between)**



( )

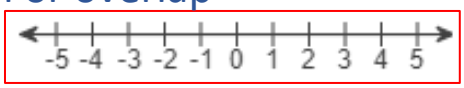
A. The solution set is $(-1,1)$.

12) Solve the compound inequality. Graph the solution set and write it in interval notation.

AND (between)

$x \le 2$ and $x \ge 4$

at no point do the graphs join or overlap

therefore it is the empty set 

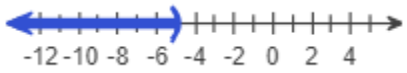
There is no solution

13) Solve the compound inequality. Graph the solution set and write it in interval notation.

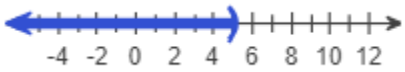
$x < -5$ and $x < 5$

AND (between) **< means ( )**

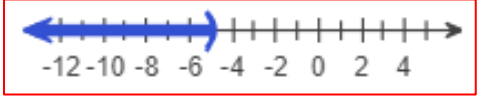
arrow of inequality points in graphs direction



X< -5 AND so we can only use what overlaps



X < 5



(-∞,)

A. The solution set is $(-\infty, -5)$.

14) Solve the inequality. Graph the solutions.

$6t - 5 < -17$ or $4t + 3 \geq 7$

$3t < -9$ or $2t > 10$ **OR (opposite direction)**

H. $t < -2$ or $t \geq 1$

< > open circle on graph with ( ) **≤ ≥ closed circle on the graph with [ ]**

< O

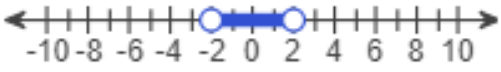
≥ ●

15) Write the interval as an inequality. Then graph the solutions.

$(-2, 2)$ **AND – between**

( ) means < O with x between

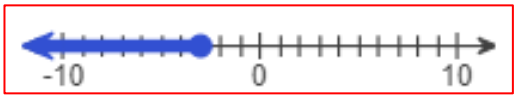
$-2 < x < 2$



16) Write the inequality in interval notation. Then graph the interval.

$x \leq -3$ arrow of inequality points in graphs direction

(-∞,] $(-\infty, -3]$



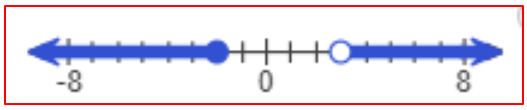
17) Write the inequality in interval notation. Then graph the interval.

$x \leq -2$ or $x > 3$ **OR (opposite direction)**

< > open circle on graph with ( ) ≤ ≥ closed circle on the graph with [ ]

≤ 0 (-∞,] or (,∞) > O

B. $(-\infty, -2]$ or $(3, \infty)$



18) Solve the inequality. Write the set in interval notation.

$6 < x + 4 \leq 14$ **AND (between)**

$-4 \quad -4 \quad -4$

$-2 < x < 10$

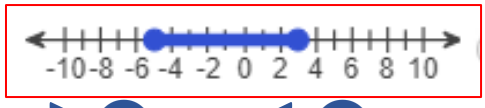
< ( ] ≤

$(2, 10]$

19) Solve the following compound inequality. Graph the solution.

$3x \geq -15$ and $5x \leq 15$ **solve each for x** **AND (between)**

C. $-5 \leq x \leq 3$

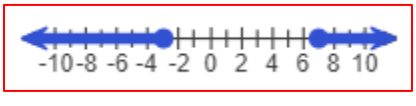


≥ 0 ≤ 0

20) Solve the following compound inequality. Graph the solution.

$9x \leq -27$ or $6x \geq 42$ **solve each for x** **OR (opposite direction)**

A. $x \leq -3$ or $x \geq 7$



≤ 0 ≥ 0